

# The digital transformation of a traditional market into an entrepreneurial ecosystem<sup>1</sup>

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## Abstract

Information and Communication Technologies (ICT) are transforming the business models and entrepreneurial ecosystems of different economic activities. As a result, the survival of some of these activities, especially physical markets, is under threat. This article aims to shed light on the distinct e-commerce mechanisms of wholesale markets that enable transforming and upgrading their ecosystem. The study combines insights from the scholarly debate on ecosystems, wholesale markets, and e-commerce with the empirical findings of a case study (a wholesale fruit market in Chongqing, China). By exploring the mechanisms and outcomes of e-commerce, this article shows that ICT adoption can be a threat as well as an opportunity for wholesale markets. On the one hand, transaction costs and marketing channel power might make physical wholesale markets less attractive for wholesalers and customers. On the other hand, network effects and business model innovation can enhance the traditional wholesale advantages of physical markets, in turn transforming and upgrading this traditional ecosystem into an entrepreneurial one.

**Keywords:** entrepreneurial ecosystem; wholesale market; digitalization; e-commerce; case study; China.

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## **1 Introduction**

Academic interest in entrepreneurial ecosystems has grown considerably (Acs et al. 2017; Alvedalen and Boschma 2017; Liguori et al. 2019; Spigel 2017), and a more contextualized understanding of these ecosystems has become a topic of increasing interest in entrepreneurship research (Audretsch et al. 2019; Ferreira et al. 2019; Kshetri 2014). Entrepreneurial ecosystems are better understood in their temporal, institutional, and social contexts, as these influence the playing field where they create competitive advantages and value for individual firms and sectors, thus shaping regional innovation outcomes (Cunningham et al. 2018; Erina et al. 2017). This is why scholars (e.g., Brown and Mason 2017; Cavallo et al. 2019; Content et al. 2020; De Massis et al. 2018) have called for more research that systematically takes the context into account, prompting studies on the role of different institutional, national, and organizational contexts in entrepreneurial ecosystems. As a result, recent studies have provided a foundation for theory building and testing the evolution of traditional ecosystems toward entrepreneurial ecosystems considering different contexts, circumstances, and processes (Auerswald and Dani 2017; Audretsch and Belitski 2017; Mack and Mayer 2016). However, despite the increase in these studies (Clarysse et al. 2014; Kolloch and Dellermann 2018), some important contexts have received limited attention.

One of these is the traditional wholesale market, understood as a shared trading platform gathering complementary or substitutive goods on a large scale (Cadilhon et al. 2003). The study of the evolution of traditional ecosystems appears to be particularly relevant in this context, since wholesale markets are the main channel for commodity trading and offer significant advantages to both businesses and buyers (Boiko et al. 2019). In particular, through economies of scale and scope, wholesale markets have historically helped businesses and buyers from all around the world reduce transaction costs and improve transaction efficiency (Barrowclough et al. 2019). Nevertheless, the growth in new retailing and retail chain formats,

and the widespread creation of manufacturing brands has led to the progressive decline of wholesale markets in advanced global economies since the 1990s (Rosenbloom 2007). However, this decline has dramatically accelerated with the emergence of the Internet in the last two decades (Fan et al. 2016), leading to ample debate on the end of the wholesale market as a traditional ecosystem (Yang et al. 2017).

As the Internet is widely used in marketing channels, some wholesale markets have taken advantage of e-commerce and transformed into entrepreneurial ecosystems with shared commodity trading platforms or even supply chain service platforms (such as the car trading market in the US) (Gregory et al. 2019). These successful transitions provide a direction to study the complementarity and integration of traditional wholesale markets and the Internet, particularly focusing on the significant role that digitalization and e-commerce might play (Ballestar et al. 2019; Liu and Walsh 2019). Additional research on wholesale markets could also provide a deeper understanding of the possibility and necessity of their existence (Leong et al. 2016), and the role of e-commerce in their successful transition from traditional business ecosystems (and wholesale markets in particular) to entrepreneurial ecosystems.

Drawing on the entrepreneurial ecosystems, wholesale markets, and e-commerce literature, the main motivation of our study is to answer the following research questions: *How does e-commerce transform a traditional ecosystem into an entrepreneurial one, and which specific e-commerce mechanisms underlie this process in traditional wholesale markets?* To address this question, we engaged in theory elaboration (e.g., Eisenhardt 1989; Eisenhardt and Graebner 2007) by contrasting existing knowledge of entrepreneurial ecosystems and e-commerce with an exploratory case study of the adoption of e-commerce in Caiyuanba, a Chinese wholesale fruit market. Caiyuanba is considered an extreme case (Mölk and Auer 2018; Siggelkow 2007) of a traditional wholesale market that has become a thriving entrepreneurial ecosystem able to respond to new (sometimes disruptive) market rules. In fact,

in 2017, transactions in the agricultural wholesale market in China accounted for over 70% of the circulation of agricultural products (Hong 2018), highlighting the relevance and appropriateness of this setting for our study.

Our analysis shows that the transition of this wholesale market from productive entrepreneurship to an entrepreneurial ecosystem was enabled by four e-commerce mechanisms: reducing transaction costs, rebalancing marketing channel power, diversifying the business scope and networking externalities, and fostering value creation while innovating the business model. By theorizing these mechanisms, we develop an advanced model that helps explain the function of these four e-commerce mechanisms leading to the transformation and upgrading of a traditional ecosystem (e.g., wholesale market) into an entrepreneurial one. Furthermore, this study explicitly shows how some of these mechanisms interact in the Caiyuanba wholesale market, providing novel insights into the specific advantages that arise from their synergy. Relatedly, our analysis offers a more fine-grained perspective of e-commerce in the context of traditional ecosystems, such as wholesale markets. More specifically, despite the ample studies on e-commerce adoption in international research (e.g., Fang et al. 2014; Wang et al. 2016), open questions remain on how financial, legal, physical characteristics, and especially cultural and business philosophy differences manifest in changes to the underlying theoretical rationale linking traditional business modes (Leong et al. 2016), such as wholesale markets, to key evolutionary drivers, such as the Internet (Fan et al. 2016). In this vein, our study adds to the literature in e-commerce by showing the impact of e-commerce adoption in a context with particular cultural and business philosophies. In addition, this study also offers important managerial implications by pointing out expertise, technical capabilities and both online and offline collaboration as essential in the integration of traditional ecosystems and e-commerce to transform and upgrade a traditional ecosystem into an entrepreneurial one.

The remainder of this article proceeds as follows. We begin by reviewing the relevant literature, after which we introduce our methodology where we also briefly describe the specific context of the Caiyuanba wholesale fruit market. Then we present our empirical findings and analysis, advancing a number of propositions. We conclude by discussing the limitations of our study and suggesting future research avenues.

## **2 Literature review**

### **2.1 Traditional wholesale markets as ecosystems**

The ecosystem concept has received increasing attention among scholars, practitioners, and policymakers (Colombo et al. 2019). Considered as a new way to depict the competitive environment (Beliaeva et al. 2019), an ecosystem refers to a group of interacting firms that depend on each other's activities (Jacobides et al. 2018). Ecosystems rely on the alignment structure and interactions of not fully hierarchically controlled actors for a focal value proposition to materialize (Adner 2017). Moreover, albeit a generally neglected attribute, ecosystems prompt coordination between interrelated but significantly autonomous organizations (Jacobides et al. 2018). Ecosystems are often deemed a crucial part of the economy and a metaphor to replace the traditional term "markets" (Audretsch et al. 2019). In this sense, Audretsch et al. (2019) point out that "firms do not just compete with each other through well-developed stand-alone strategies to achieve advantages over their rivals, uniquely relying on their own resources, knowledge, and capabilities.... strategic and competitive advantages are increasingly based on shared resources, network externalities, knowledge spillovers, local endowments, and governmental support" (p. 314). Following this reasoning, the traditional wholesale market exemplifies the concept of a traditional ecosystem and the related characteristics. More specifically, wholesale markets are generally composed of different agents, such as interrelated but autonomous firms that share a trading platform, gathering complementary or substitutive goods on a large scale (Bromley 1971). These firms

as well as other agents of the ecosystem, such as customers, benefit from a reduction in transaction costs and improved transaction efficiencies based on economies of scale and scope (Barrowclough et al. 2019).

## **2.2 From traditional to entrepreneurial ecosystems via digitalization and e-commerce**

Although there is no commonly accepted entrepreneurial ecosystem definition, we follow Stam (2015) who defines it as a “set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory” (p. 1765). A widely-held belief is that entrepreneurial ecosystems are mainly about start-ups, where a more identifiable indicator of a well-functioning ecosystem would be the number of unicorn ventures anchored in a city (Acs et al. 2017). However, many different actors, not directly related to start-ups, are crucial elements of an entrepreneurial ecosystem (Brown and Mason 2017; Liguori et al. 2019). For instance, large firms could be a source of entrepreneurial value creation, as they are important initial customers, incubators of entrepreneurs, attractors of skilled labor, and providers of knowledge spill-overs (Eliasson, 2001; Harrison et al. 2010). As such, different actors, both large and small businesses, may play an important role in transforming a traditional ecosystem into an entrepreneurial one. In this research, we deepen in how a specific traditional ecosystem such as a wholesale market could become an entrepreneurial ecosystem by focusing on the role of digitalization and e-commerce.

The evolution of the Internet and recent advancements in Information and Communication Technologies (ICT) have accentuated the gradual decline of wholesale markets and their traditional functioning in the last two decades (Fan et al. 2016). As such, the ongoing global digitalization (Newell and Marabelli 2015) poses new challenges to traditional firms in terms of new competitors and new market rules (Bouncken et al. 2019; Correani et al. 2020). In this sense, ICTs have been widely used in marketing and online procurement, giving rise to the e-commerce phenomenon (Bakos 2001; Ballestar et al. 2019). The inherent advantages of e-

commerce in terms of transaction technology, transaction methods, and transaction efficiency have led scholars to identify both substitutive and complementary effects on the trading modes and functions of traditional markets (Fang et al. 2014). Regarding the substitutive effect, e-commerce can gradually weaken the historical advantages of wholesale markets, such as low-cost and high concentration, driving wholesale markets towards the risk of recession or demise (Rosenbloom 2002). Regarding the complementary effect, e-commerce can act as a complementary and efficient tool for wholesale markets to transform, evolve, and survive (Nakayama 2000). In addition, e-commerce can offer added value to wholesale market customers through new content, affiliate websites, and efficient search engines (Subramanian and Overby 2017).

In practice, traditional wholesalers and wholesale markets continue to exist. However, the ecosystem of wholesale markets has evolved with e-commerce. Through e-commerce technology, wholesale markets achieve service innovation (Haluk 2015; Yang et al. 2017), improve supply chain efficiency and thereby business efficiency (Ranganathan et al. 2004; Iannella 2004), allowing the wholesale market to surpass the role of intermediary and act as system supporter in the supply chain (Markus and Christiaanse 2003). In this evolution, new types of middlemen, such as content providers, affiliate websites, and search engines, have become part of the ecosystem (Carr 2000). Moreover, as building digital capabilities becomes a strategic activity, technology providers have the opportunity to develop new business models (Schneider 2018).

Overall, digitalization and the design and implementation of an e-commerce strategy can help traditional ecosystems evolve toward an entrepreneurial ecosystem. The arrival of new agents and the related interactions have disrupted different aspects of wholesale markets, and the resulting changes, particularly in non-western countries culturally attached to their traditions, merit further attention. As such, the in-depth and extreme single-case study of a

wholesale market in China will enable understanding how digitalization has transformed a traditional ecosystem into an entrepreneurial ecosystem.

### **3 Research method**

We use a single-case research design that is appropriate to investigate complex processes involving several actors in relation to the adoption of different e-commerce mechanisms to upgrade and transform a wholesale market (Leong et al. 2016). Moreover, this single-case study enables observing an unusual, intriguing, and extreme organizational context where the processes of interests are more easily observable (De Massis and Kammerlander 2020; Delmestri and Greenwood 2016; Eisenhardt 1989). The study focuses on the Caiyuanba (菜园坝) wholesale fruit market based in Chongqing, one of the four municipalities under the direct administration of the central People's Republic of China government. Our main goal is theory elaboration, a process in which current understanding is contrasted with observed events and interviews with experts to extend existing theory (Dapiaz et al. 2016; Lee et al. 1999). Hence, we adopted the main guidelines for inductive techniques (Yin 1989; Klein and Myers 1999) and started by analyzing the case, identifying the general patterns, and developing theory through recursive cycling among the data. We use the emerging theory and existing literature to extend and enrich our understanding of how wholesale markets might embrace e-commerce as a strategy implemented through different mechanisms.

#### **3.1 Research setting: the case of the Caiyuanba wholesale fruit market**

Chinese wholesale markets provide an ideal setting to explore the role of e-commerce and the related mechanisms. Several studies show that wholesale markets have gradually declined in advanced global economies since the 1990s (Lu and Wang 2008). Even in China, where professional markets still play an important role in distribution, many wholesale markets face a significant decrease in sales, and in some cases, bankruptcy (Chen and Ma 2004; Hong 2018).



As a consequence, some wholesale markets have had to reinvent themselves to exploit the advantages of e-commerce (such as the Yiwu Small Commodity Exchange Market). Therefore, e-commerce mechanisms and outcomes are particularly critical for wholesale markets in the new digital era (Gregory et al. 2019).

Caiyuanba was established in 1996 and is part of the Chongqing Public Transportation Group. The market as a whole covers 12 million square meters and is divided into five main sections: the fruit market, the agricultural products distribution center, the leather market, the entertainment products market, and the cargo transport market. The fruit market (henceforth Caiyuanba), with an area of 120,000 square meters, is the first in Chongqing to adopt e-commerce. After more than 20 years of continuous growth, this top-tier market trades over 200 domestic and foreign fruits. The annual transaction volume exceeds 600,000 tons and reaches 5 billion yuan (around 750 million US dollars), employing more than 10,000 people. It is the largest “fruit plateau” in Chongqing and a platform for fruit export.

With the rise of the Internet, Caiyuanba was facing increasing pressure, including a decrease in the volume of physical transactions, the emergence of e-commerce platforms and marketplaces, and functional changes to the market. Relying on IT and the Internet, a local firm (Chongqing Xiangmanyuan Agricultural Products Co. Ltd.) broke through the time and space boundaries of traditional commerce. It provided consumers with diversified consumption channels and methods, becoming more and more accepted and even habitual. In the e-commerce era, in the face of increasingly diversified user needs and market segmentation, traditional companies have unknowingly accelerated the pace of transitioning toward e-commerce. Indeed, Caiyuanba independently developed a B2C platform for residents, the Xiangmanyuan (香满园) online shopping platform, offering fresh produce from 2011. As a consequence, online sales have increased year by year (see Table 1), and it is now the largest agricultural products e-commerce platform in Southwest China.

**Table 1.** Xiangmanyuan - Caiyuanba Online Shopping Platform, 2013-2019 online trading (in billion yuan)

	2013	2014	2015	2016	2017	2018	2019
Sales	1.08	1.53	2.08	2.58	3.10	3.96	5.11
Growth rate (%)	—	41.67	35.95	24.04	22.53	27.74	29.04

Source: Chongqing Municipal Commission of Commerce

### 3.2 Data collection

Given the industry type, the enterprise-scale, and its evolution, this wholesale market is particularly suited for the purposes of our study. The adoption, implementation, and refinement of an e-commerce strategy is a multi-phased evolutionary process that takes place over many years and entails different mechanisms. As such, our data collection took several forms: semi-structured one-to-one interviews that constitute our primary data source; documents, internal reports, market history, and other published material; on-site observation and informal visits; as well as supplementary official documentation.

The interviews were conducted in 2019 at the market's headquarters, each typically lasting 1–1.5 hours. Some individuals were interviewed more than once (up to three times) to clarify critical issues that emerged as the study progressed. In particular, we conducted 24 interviews with ten different informants (see Table 2A in the Appendix). The last series of interviews was conducted in the autumn of 2019. For data collection and examination purposes, we focused the interviews and subsequent analysis on the following aspects of e-commerce in Caiyuanba: e-commerce turnover, services provided to wholesalers, change in turnover, choice of cooperative business owners, change in business scope, new business development, consumers information optimization, market services, changes in transaction costs, logistics costs, operating income growth, commodity inventory issues, comparison between online and offline transactions, purchasing-delivery cycle, return services, fruit quality, and complaint mechanisms (see Appendix A).

The research began with two comprehensive meetings with the Chief Manager of Caiyuanba and the head of the e-commerce unit (e-commerce Manager). These meetings provided background information on the wholesale market in general and the e-commerce business in particular, and allowed us to collect various forms of documentation. The subsequent series of interviews focused on wholesalers and buyers. Once the interviews were conducted and transcribed, for triangulation purposes and to ensure accuracy, the case data were reviewed and verified by our key respondents.

### 3.3 Data analysis

We began the data analysis with a preliminary understanding of the main roles and functions that characterize the wholesale market over its lifecycle and how e-commerce has influenced its evolution in recent years. In the analysis, we explored all the mechanisms related to Caiyuanba’s adoption of e-commerce and the related outcomes, grouped according to the emerging themes. As the study progressed, we combined the emerging picture with a theoretical perspective. We identified four themes (mechanisms) that together guided Caiyuanba’s efforts toward upgrading and transforming the ecosystem (see Table 2).

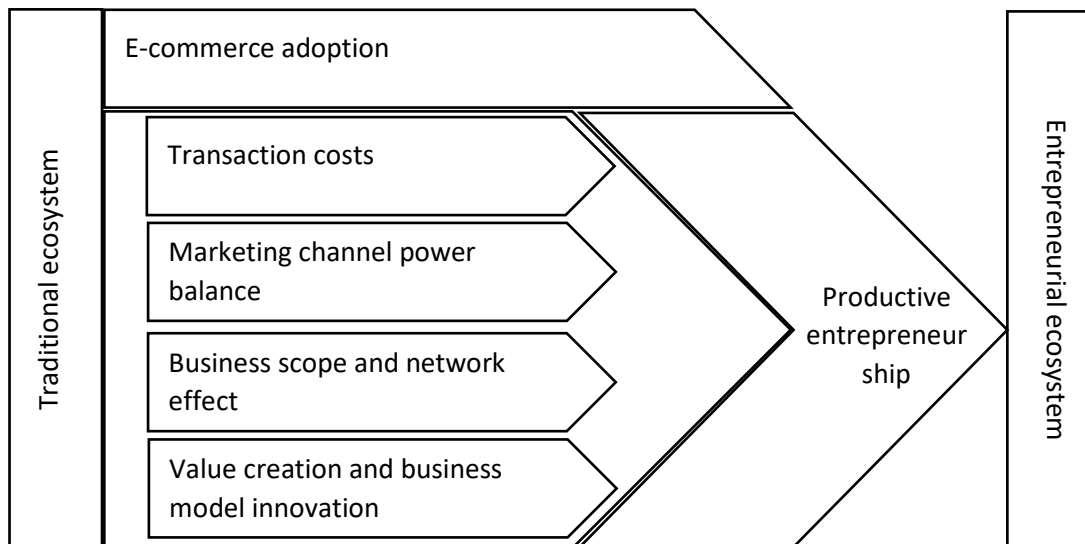
**Table 2.** Themes and sub-themes emerging from the data analysis

	<i>Themes</i>	<i>Sub-themes</i>
<b>How does e-commerce impact the ecosystem of traditional wholesale markets?</b>	Transaction costs	Search and negotiation costs
		Coordination costs
		Information asymmetry and opportunistic behavior
	Marketing channel power	Relationship between the wholesale market and wholesalers
		Relationship between wholesalers and customers
	Business scope & network effect	Geographic diversification
		Product diversification
	Value creation & business model innovation	Platform profit model
		New business development

After identifying each mechanism, we conducted a second set of interviews, and produced draft papers of the results sent to the various managers interviewed for verification. Our case study can be classified as explanatory (Cornelissen 2017), as we used the empirical evidence to understand how each of the mechanisms and subsequent effects impacted Caiyuanba’s transformation and upgrading. We next analyze the interplay of the identified mechanisms, combining the evidence from the case study with theoretical insights from both the wholesale market (ecosystem) and e-commerce (digitalization) literature with the debate on the main aspects of wholesale markets (existence, spatiality, and future development).

#### 4 Findings

We now present and describe our findings on the four e-commerce mechanisms that emerged from our case study. Figure 1 provides a contextualized framework to illustrate the mechanisms through which e-commerce enables productive entrepreneurship in a traditional market, giving rise to an entrepreneurial ecosystem.



**Fig. 1** E-commerce model promoting the transformation of the wholesale market

##### 4.1 Transaction costs

Engaging in economic transactions produces transaction costs (Coase 1937; Williamson 1985) including: i) search costs, ii) negotiations costs, and iii) enforcement and coordination costs. These costs increase with information asymmetry among the economic agents involved in the transactions (Wang and Lee 2017). By improving the efficiency of information, capital and commodity flows, e-commerce may reduce transaction costs (Overby and Forman 2015; Wu et al. 2014).

From the perspective of the interviewed wholesalers, under the traditional wholesale market model, the costs incurred in transactions were numerous and heavy. First, wholesalers often relied on intermediaries (such as rural brokers) to buy fruit from the growers, and these intermediary expenses ran through the whole purchasing process. Second, when operating in the wholesale market, wholesalers face labor costs, market entry fees, sales booth fees, and storage and logistics costs. For instance, *“More than 80% of wholesalers in the market have no fixed booths. We had to rent a truck for distribution. Sometimes, one truck is too big, resulting in wasting money”* (Interviewee W2). Finally, another particularity of the traditional wholesale market is that wholesalers and buyers faced substantial search and negotiation costs due to the physical size of this market. *“Wholesalers have to wait for customers, and it is tough to find new customers, with some customers going to the market several times for negotiations, which takes a long time”* (Interviewee W1). With the adoption of e-commerce, wholesalers reduced these transaction costs. Indeed, e-commerce platforms connect farmers and wholesalers directly, eliminating the intermediary fees in the transaction. As Interviewee M2 pointed out, *“The Xiangmanyuan e-commerce platform collects a large number of orders and therefore generates large scale orders; we now go to the farmers to purchase together with wholesalers in the field and farm”*.

Wholesalers use e-commerce to reduce search, negotiation, and other transaction costs both in B2B and B2C. The e-commerce platform increases the efficiency of search, negotiation, and

matching wholesalers with buyers. The reduction in coordination costs is mainly due to the e-commerce platform's information, negotiation, payment, and distribution systems. Indeed, negotiations, viewing the products, price negotiations, shipment, cash payment, and many other steps are simplified. According to Interviewee M2, *"Video software is embedded in the community using the B2B e-platform. Similar to the video call, wholesalers and purchasers do not need to come to the market. The sellers display the products to customers through the online video, communicating the product characteristics, categories, and prices in detail, then negotiating prices, through to placing orders directly on the platform"*.

From the buyers' perspective, through the e-commerce platform, their procurement costs have significantly reduced. For instance, the platform allows off-site buyers to quickly and effectively connect with wholesalers. *"In the past, we had to go to the Caiyuanba fruit market to place orders personally, spending a lot of energy and money. We couldn't get refunds for low quality fruit after the money was paid. Now we place orders online, and the goods will be delivered to my supermarket and can be returned if the quality is not satisfactory. It is much more convenient than before"* (Interviewee B1).

In addition, e-commerce allows optimizing and upgrading the supply chain in terms of shortening intermediate links, integrating business processes, resolving information asymmetry issues, reducing commodity inventories, and mass customization. As a result, the performance of the supply chain has significantly improved. First, Caiyuanba relies on a transport company (Chongqing Road Transportation Group) to provide unified picking and packing for wholesalers and distribution in the city. The synergies in procurement among wholesalers through the e-commerce platform also contribute to a reduction in the logistics costs. According to Caiyuanba's marketing department statistics, the distribution costs of wholesalers dropped by 38%. Second, the wholesale market uses the e-commerce platform to provide wholesalers with a free information service on price, market conditions, and

marketable products. This helps wholesalers adjust prices according to market conditions and promptly identify consumer preferences.

Moreover, the data the platform collects allow improving the inventory, which reduces inventory costs, particularly the losses in terms of fresh goods. According to Interviewee W3, *“The e-commerce platform system collects online orders all day and sends the purchase volume information of each product to the wholesaler. When we get the order, it is time for purchasing. We will purchase the goods according to the order requirements and send them to the market after 9pm on the same day. Products are then sent to the sorting and packing center for unified sorting and packing. The loading and distribution will start at 7am the next morning, so now we don’t need to pre-stock a large amount of goods”*.

Caiyuanba uses e-commerce to effectively integrate the *physical* and *virtual* markets, in turn reducing transaction costs and promoting productive entrepreneurship. On the one hand, e-commerce transforms the physical market from a trading venue to support services including warehousing, sorting, packing, and distribution. On the other hand, the use of a virtual market offers convenience for buyers in terms of searching the categories, quality, and price of goods from wholesalers. In the resource-based view, “transaction costs shape the process of entrepreneurial discovery” (Foss and Foss 2006, p. 58). That is, entrepreneurs may take advantage of economizing the transaction costs, as well as increasing entrepreneurial rent through the acquisition of strategic factors at a price below the discounted net present value (Foss and Foss 2006; Kim and Mahoney 2006). Based on these arguments, we suggest the following:

***Proposition 1:*** The synergy between electronic transactions and physical markets reduces the coordination, search, and negotiation costs of a traditional market so that entrepreneurs can take advantage of the opportunities generated by the reduction of these costs to create entrepreneurial value.

## 4.2 Marketing channel power balance

In a marketing channel, power is defined as the ability of one member of the channel to influence the decisions of another member to bring about a desired outcome (El-Ansary and Stern 1972). All members of the channel have power, and all want to use it to increase their profits (Pan et al. 2010). Moreover, firms may use their power to favor themselves at the expense of weaker counterparties, instead of enhancing joint value (Carson and Ghosh 2019). On the other hand, a highly balanced channel power structure promotes trust and commitment among channel members, thereby improving overall system performance (Gundlach and Cadotte 1994; Kim and Hsieh 2003). Dependencies determine channel power, and specialized channel members depend on each other in multiple ways (Emerson 1962; Zhuang and Zhou 2004). In this sense, e-commerce generates a new marketing channel (Gallaughier 2002). This new channel reduces entry barriers for new actors, and provides manufacturers and distributors with alternative options that reduce their dependence on traditional wholesale markets and channel power (Rosenbloom 2002).

Caiyuanba's channel power is based on two main relationships: on one side, the relationship between the wholesale market and the wholesalers; on the other, the relationship between wholesalers and customers. In the past, Caiyuanba's business scope for wholesalers was mainly providing a trading venue and transaction services. With the development of e-commerce, the wholesalers have been able to reduce their dependence on the market by opening online shops or using mobile internet marketing on large-scale national e-commerce platforms, which inevitably caused the regional wholesale market to shrink. This process was accentuated by the generational change among wholesalers, as Interviewee M2 pointed out, *"The wholesalers here are mostly people born in the 1950s and 1960s. Most of them have reached retirement age and their children are gradually replacing them. Since the successors are mainly post 80s and 90s children, even 00s generations, they do not adopt traditional business practices, like*



*taking the cash early in the morning to pick up goods, arranging vehicle distribution then transporting the fruit back. They are more accustomed to online purchasing, Alipay or WeChat payment, and directly finding a distribution company to distribute the goods.”*

The Xiangmanyuan e-commerce platform adopts a multi-channel strategy to rebalance the power and increase the dependence of wholesalers on the wholesale market. Indeed, this strategy increases wholesalers' utility and lowers the attractiveness of alternative e-commerce platforms. Wholesalers benefit from e-commerce advantages, such as the enlargement of the geographic area of markets and information disclosure, but also offline activities that provide value to wholesalers, such as sample presentation, warehousing, and logistics, as well as distribution services in the physical market. In this sense, *“Wholesalers can implement transactions or publish information on the e-commerce platforms related to their products and quality assessments through our platform. Moreover, there is a logistics and warehousing center in the wholesale market, which provides warehouse leasing and inventory management services for wholesalers. After an online order is placed, the suppliers will send the fruit to the sorting and packing center of the wholesale market based on the order requirements. The sorting and packing center uniformly sorts and packs the goods according to the online sales specifications and standards, and delivers them to the logistics center for distribution”* (Interviewee M2).

This rebalancing of power has generated new forms of collaboration that increase the interdependence between the wholesale market and wholesalers. In this sense, Interviewee M1 explained, *“We have high cooperation with the wholesalers in the market. We will select one to two excellent suppliers as e-commerce suppliers for each product. We also form a virtual enterprise alliance and together select the products, place orders, and set the prices, and finally, introduce the products to our platform. Taking apples as an example, many wholesalers sell apples on the market. We will first choose one with a good reputation and long-term*

*cooperation with us. In other words, we will go with them to the source of the goods, set the price and implement sales strategies together*". This can be understood as a win-win strategy where both the wholesale market and wholesalers collaborate while the interdependence between them grows.

In view of all above, we conclude that although e-commerce reduces the power of the physical market, the latter may rebalance the power by becoming an entrepreneurial ecosystem and taking advantage of its infrastructure. Hence we propose:

***Proposition 2:*** E-commerce reduces the power of the physical market, but the physical market may rebalance the power by becoming an entrepreneurial ecosystem and taking advantage of its infrastructure.

Regarding the relationship between wholesalers and customers, in traditional transactions, buyers are disadvantaged due to information asymmetry. For instance, Interviewee B3 stated, *"In the past, when we did not have an e-commerce platform to trade on, our purchase methods were all in the market for on-the-spot transactions, but the prices offered by different wholesalers in the market varied. There were numerous merchants in the market. Therefore, there was no effort or time to compare the prices in all booths, meaning the final transaction price was not the lowest price in the market"*.

Through the Xiangmanyuan e-commerce platform, channel power gradually turned from wholesalers to customers. Indeed, with the presentation of information on the wholesalers' merchandise, prices, and reputation, information asymmetries considerably diminished, limiting moral hazard and the opportunistic behaviors of wholesalers. As one customer pointed out, *"With the online trading platform, I can automatically compare fruit prices of different wholesalers through the platform. I can also see the product types and the reputation of all merchants, which greatly facilitates my choice"* (Interviewee B1). Another stated, *"The Xiangmanyuan online shopping platform also has a shopping feedback function. If the*

*customer encounters bad service attitudes, poor fruit quality, and other issues, he/she can apply for returns, refunds, or even make complaints and suggestions” (Interviewee B2).*

The use of the e-commerce platform has thus increased the power of buyers, and symmetrically, weakened the power of wholesalers. As a result, many wholesalers initially resisted. However, thanks to e-commerce, distributors can improve the quality of their services or develop new services, which allows them to increase customer loyalty and attract more clients. Wholesalers and buyers rely on each other, eventually leading to a relatively stable power balance. Based on this analysis, we propose:

***Proposition 3:*** As the adoption of e-commerce increases the power of buyers in the wholesale market, wholesalers must use e-commerce to provide good quality and personalized services, and develop buyer dependency.

#### **4.3 Business scope and network effect**

Before the development of e-commerce, Caiyuanba’s business scope was mainly concentrated in key urban areas due to the geographic restrictions of the physical fruit market and the characteristics of fruit. A critical issue of the transaction process was the difficulty in meeting bilateral demand. On the one hand, buyers wanted more sellers and products to choose from, as well as sufficient information to ease the purchasing decision. However, information asymmetry and the limited number of wholesalers for each product category hindered their purchasing decisions. On the other hand, wholesalers wanted to expand their transaction volume. However, the growth in offline sales was slow due to geographic restrictions, and meanwhile, the number of wholesalers in the market increased so as to severely squeeze their profits.

After the development of e-commerce, the market space of wholesalers expanded beyond the main urban areas, even to provinces outside Chongqing. As Interviewee M1 stated, *“Now our online transactions are mainly in urban areas, but there are nearly 20% online*

*transactions happening outside the urban areas, which shows that the development of e-commerce has broadened the business scope of the market and further promoted the increase of market transactions*". This increase in market potential attracts new wholesalers to the Xiangmanyuan platform. According to Interviewee M2, *"The flow on the Internet is gradually increasing, so is the number of wholesalers participating in e-commerce. At the same time, we are trying to maintain online user satisfaction and prevent the malpractices of wholesalers through effective monitoring and firmly controlling the quality of the fruit sold online, which improves the credibility of wholesalers"*.

Overall, e-commerce has attracted a large number of suppliers, buyers, and consumers, resulting in a significant network effect. In other words, the utility of users increases with the size of the market (Katz and Shapiro 1985; Yoo et al. 2002). On one side, e-commerce reduces wholesalers' costs, and some of this cost reduction has returned to buyers or consumers. At the same time, providing product and wholesaler information as well as the ease of using e-commerce satisfies the demand for convenient transactions, comprehensively enhancing the buying experience, attracting more users, and expanding the buyer-user network size. On the other side, the benefits for wholesalers resulting from e-commerce have attracted more wholesalers, in turn increasing the number of wholesalers who use the network. Moreover, bilateral users have extended their local businesses to the whole country, with the business scope broadening accordingly. In this sense, Interviewee M2 stated, *"Not only fruit products, but also eleven major categories, such as grain and oil, have been included in the e-commerce platform, and the number of single items sold annually is basically between 6,000 and 7,000"*. This jointly promotes bilateral user flows, forming a significant positive network effect and increasing the degree of adhesion of users and wholesalers to the e-commerce platform.

Network externalities and user experience have a significant positive impact on user loyalty and satisfaction (Zhou and Lu 2011). Obtaining a large-scale user base and maximizing market

share through an appropriate and competitive strategy are the most important elements of the network effect produced (Baake and Boom 2001). The direct benefit that e-commerce brings to the wholesale market is an increase in participators, which amplifies the network effect of the bilateral market. This is an essential driving force for the wholesale market to implement e-business transformation. E-commerce, as a modern information exchange system, and the related characteristics (borderless, distance-free, and timeless) allow expanding the geographic markets (Steinfeld et al. 2002). The range of buyers and sellers in the wholesale market swells from a narrow region level to the national or even global level. Through e-commerce, the number of bilateral users on a platform rapidly increases, and the more suppliers, the more opportunities for buyers to search for the right price or better trading conditions, and the greater the value of the supplier network to buyers. The more buyers, the easier it is for suppliers to find buyers and match their needs, and the greater the value of the buyer network to the supplier. As a result, the degree of adherence of all users to the platform increases (Yoo et al. 2002). The network effect also pushes suppliers to actively adopt e-commerce strategies. Due to the network effects, wholesale markets and bilateral users are motivated to use e-commerce to provide goods and services, enhancing these services through the network effects, such as product and service recommendation systems, information consulting, trust mechanisms, simplified transactions, enterprise cloud computing, supply chain finance, and modern logistics (Subramanian 2017), thus further increasing the degree of adhesion of bilateral users to the wholesale market. Therefore:

***Proposition 4:*** E-commerce increases productive entrepreneurship in wholesale markets through the diversification of the business scope and positive network externalities.

#### **4.4 Value creation and business model innovation**

E-commerce plays a key strategic role in creating added value and value-added activities for companies and other participating entities, and has become an essential component of business

performance (Amit and Zott 2001, 2012). The value creation of e-commerce platforms consists in new information combinations, offering a broad array of products and services, innovative trading mechanisms, and the reconfiguration and integration of resources, capabilities, roles, and relationships between suppliers and customers (Zott et al. 2000). The standardization of operations in the wholesale market has brought excess returns for wholesalers who have optimized the supply chain process via e-commerce. Transaction costs have significantly reduced and sales revenues have increased through a unified information, settlement, distribution, and after-sale system. Caiyuanba provides wholesalers free services, including sorting, packing, market planning, customer service, and website design. As Interviewee W4 stated, *“I opened a shop on Taobao (...) and business was difficult to do. After I joined the Xiangmanyuan e-commerce platform, I shut the Taobao shop. Now I only need to focus on product procurement and quality assurance. Cooperation with Xiangmanyuan has made everything much easier, and there is a steady income every month. I can now receive 30 thousand retail orders on the e-commerce platform in one month, accounting for about 40% of my business”*. In this regard, Interviewee W3 added, *“Relying on the platform to implement product development and customization has also brought significant excess returns for the wholesalers”*.

Regarding value creation through personalization, Interviewee M2 stated, *“We have developed specification standards and specialty products under the e-commerce environment. Due to the characteristics of small batches, multiple frequencies, and uneven weight of fresh fruit transaction, we try to provide personalized packing services for wholesalers. Taking apples as an example, we have developed a lot of specifications, including packing for 2 and 4 etc., as well as unique packing such as pre-sale packs, sub-packs, and family packs, to meet the different needs of consumers and increase consumers’ willingness to repurchase (...) the average unit price will be lower for customers, and the sales volume increases for*

*wholesalers*". Through personalized packing, wholesalers can formulate prices for different packing specifications to achieve excess returns on commodity prices.

Another service product development refers to the use of big data analysis to identify consumer preferences in time, and develop products that are *"new, special, and excellent"*. Interviewee M1 also said, *"After each product is launched, we will use the sweetness tester, and make a cartoon image on the platform display. For example, 1-5 is slightly sweet, 5-10 is medium sweet, and 10-15 is very sweet. We found an interesting phenomenon during the data analysis that Chongqing consumers like sweet fruit; the degree of sweetness is generally over 13. Although the ugly apple from Zhaotong, Yunnan looks bad on the surface, it is sweet, so we introduced it to the Chongqing market, and it turns out that the apples are popular among consumers"*. Consumer preferences can be identified by accurately analyzing the big data, and the corresponding goods promoted according to these preferences. In this way, the richness of the product range in the wholesale market has improved and excess returns realized.

The source of Caiyuanba's profit changed from a single entry fee model to diversified profit models, including, amongst others, service income, financial income, sales revenue. Thanks to e-commerce, Caiyuanba has expanded its industrial chain rapidly from market management and transaction services to wholesale, retail, logistics, finance, procurement, design, production, training, park construction operations. In so doing, it has substantially increased its earnings and improved the profit structure. At present, Caiyuanba provides free services, including online store decoration, operation substitution, packing design, marketing and promotion, information consulting, and account settlement. In this sense, Interviewee M2 explained, *"We strongly cooperate with wholesalers through retailing on e-commerce platforms, sharing e-commerce revenue. Besides the e-commerce platforms, we also operate collection and distribution centers (...) we provide online purchasing services to wholesalers"*

*and social enterprises in the market (...) we also developed new financial services, such as procurement and credit sales”.*

Therefore, Caiyuanba expanded from wholesale to retail, to finance, logistics, procurement, design, production and education, leading to additional sources of income. Therefore:

**Proposition 5:** Through e-commerce and collaborating with upstream and downstream partners in the value chain, ICT related resources can be transformed into entrepreneurial value creation.

## **5 Discussion and implications**

### **5.1 Theoretical and managerial implications**

The Caiyuanba case study offered us the opportunity to analyze the transformation of a traditional ecosystem into an entrepreneurial one. More specifically, this study allowed us to deepen the e-commerce adoption process in the wholesale market, providing an extreme and insightful case of a Chinese wholesale fruit market that routinely combines traditional commerce and e-commerce. With this case-based study, we address the general lack of attention to specific contexts, such as wholesale markets, in the evolution from a traditional ecosystem to an entrepreneurial one. We obtained several theoretical and managerial insights into how the different e-commerce mechanisms generate entrepreneurial value in a traditional market ecosystem.

First, we add to studies on how e-commerce transforms economic activities (Chiu et al. 2014; Cui et al. 2019; Fan et al. 2016). More precisely, we contribute to theory development by offering empirical support to further investigate and anticipate the evolution of a traditional wholesale market. In this regard, the Internet revolution and ICT adoption become a type of double-edged sword for the traditional wholesale market system. On the one hand, through the transaction costs and channel power mechanisms, wholesale markets may become less attractive for both wholesalers and customers. On the other hand, the Internet allows wholesale



markets to develop additional services (e.g., transaction matching, virtual display, and online auctions) that complement and even improve the traditional advantages of the physical market (service capabilities, warehousing, and logistics). In this way, the wholesale market could be revitalized, providing the conditions for re-intermediation, possibly expanding the dominance of wholesale markets in the distribution field and attracting new agents to this new entrepreneurial ecosystem.

Second, we provide a more fine-grained and somewhat different perspective on several e-commerce mechanisms. In particular, we have delved into four mechanisms through which e-commerce has transformed a wholesale market: i) transaction costs, ii) marketing channel power, iii) business scope and network effect, and iv) value creation and business model innovation.

Regarding *transaction costs*, e-commerce reduces the coordination, search, and negotiation costs of traditional markets. First, process improvement through e-commerce reduces coordination costs by redesigning or decreasing inefficient processes (Fang et al. 2014; Wang et al. 2006). Second, e-commerce transactions reduce the information search and negotiation costs for both sellers and buyers (Overby and Forman 2015; Subramanian and Overby 2017). For instance, the wholesale market e-commerce platform serves as a hub for participants to exchange information on products and prices, amongst others. Since changes in transaction costs could alter the distribution of competitive advantages in an industry (Foss and Foss 2006), entrepreneurs might take advantage of such changes.

Regarding *marketing channel power*, e-commerce generates a new marketing channel that influences the power of all members. Different channel members can choose distinct channel power strategies based on their position in the channel power structure to consolidate their favorable position or improve adverse conditions (Carson and Ghosh 2019). With regard to wholesale markets, some have implemented a multi-channel strategy, adopting online sales,

but also network-based transformation through platform-specific investments in technology and supply chain infrastructures. This multi-channel strategy has broadened and deepened the ability of wholesale markets to provide customers with distribution services (Rosenbloom 2007), combining functions, such as transaction matching, business negotiation, information services, and network finance in the virtual market with physical market sample displays, warehousing, and distribution logistics (Win 2008). It also provides distributors with greater utility and higher conversion costs, which in turn increases the distributors' dependence on wholesale markets. Such cooperation, while maintaining the independence and autonomy of both parties, allows holding each other's valuable and scarce resources, providing each other higher utility. Under this circumstance, wholesale markets and distributors remain in a highly dependent state where channel power tends to be highly balanced.

As for the *business scope and network effect*, we propose that e-commerce adoption increases productive entrepreneurship in wholesale markets through the diversification of the business scope and positive network externalities. Indeed, e-commerce increases the number of participators in the wholesale market, in turn enhancing the network effect (Yoo et al. 2002). Driven by network effects, wholesale market participants are motivated to use e-commerce to provide new goods and services, which amplifies the network effects (Subramanian 2017). Considering that “the entrepreneurial ecosystem concept emphasizes that entrepreneurship takes place in a community of interdependent actors” (Stam 2015, p. 1761), e-commerce contributes to the transformation of a traditional ecosystem into an entrepreneurial one through the network effect.

We also contribute new insights on *value creation and business model innovation*. Through e-commerce connections and collaborating with upstream and downstream partners in the value chain, ICT-related resources can be transformed into entrepreneurial value creation. As the wholesale market adopts e-commerce and ICT technologies, technology providers have the

opportunity to develop new business models and entrepreneurial opportunities (Kraus et al. 2019; Schneider 2018; Zott et al. 2000). For instance, wholesale market e-commerce platforms collect large amounts of data, including sales data, product data, and consumer behavior data. The systematic processes of fragmented and structured big data allow the wholesale market to provide information, marketing, technical, and insurance services to obtain extended benefits. Indeed, the literature confirms that through e-commerce connections and collaborating with upstream and downstream partners in the value chain, ICT-related resources can be transformed into value creation, including enhanced process, financial, and network performance (Rai et al. 2006).

These insights also have important managerial implications. The future of wholesale markets faces a clear division between those who embrace new technologies and those who do not adopt or resist emerging technologies. However, several capabilities are essential in the integration of wholesale markets and e-commerce to transform and upgrade the ecosystem. The first is expertise. The advantage of avoiding disintermediation in the wholesale market is the distribution and provision of professional services. Compared to other channels, better products and services are provided to the main parties in the value chain. Therefore, the managers of wholesale markets should pay close attention to the marketing channels, distribution systems, and supply chain reforms, achieving re-intermediation through improving efficiency via service innovation, adding value to the distribution system. The second is online and offline collaboration. An important business model innovation is transforming the wholesale market into an online and offline collaborative omnichannel trading platform through a virtual online trading platform. The third is the technical capability to achieve value-added income and profitability. In addition to a trading platform, managers of wholesale markets must motivate these organizations to adopt modern technologies, such as artificial intelligence, block chain, and the Internet of Things to develop more value-added business

activities, such as market forecasting and selection, dynamic pricing, inventory management, resource sharing, information systems, financing and payment, research and innovation, amongst others.

## 5.2 Limitations and future research avenues

Our explanatory model requires acknowledging some limitations, and only allows analytic generalization to theory. Relatedly, our study focuses on a single case in a specific industry, and industry-specific effects are acknowledged to shape the determinants, mechanisms, and outcomes of the e-commerce phenomenon. More generally, our findings are Chinese context-specific, which may contribute to explaining the effectiveness of our model, as well as the conditions under which e-commerce adoption may act as a strategic transforming and upgrading tool. In this sense, the survival and transformation of traditional markets into entrepreneurial ecosystems may be reinforced by cultural aspects of Chinese society. Among these aspects, *guanxi*, which means *good connections* (Tsang 1998), could play an important role. Indeed, *guanxi* implies Chinese entrepreneurial ecosystem will be based on proximity relationships among the members of the ecosystem, which usually are long-term relationships (Park and Luo 2001; Liao 2016). In line with it, future research might investigate whether ICT adoption influences business culture in a country with a very traditionalist culture such as China.

Although our findings do not allow statistical generalization since they are based on a single country with specific culture, they facilitate theory building via analytical generalization (Eisenhardt and Graebner 2007). As such, more qualitative and quantitative studies are needed to further investigate the interplay between the structure and context in an organization's pursuit for ambidexterity. Hence, future studies might extend our conclusions by considering other geographic contexts with different cultural, political, and technological features (Álvarez et al. 2015). In addition, our empirical study does not include the views of manufacturers,

retailers, and customers using other e-commerce platforms for their transactions. A comparative study of buyers adopting different procurement practices may shed light on the future of wholesale markets. In the same vein, this study has not considered the potential complementarity between buyer and seller benefits in terms of efficiency outcomes. Future research might attempt to examine the synergistic effects of other e-commerce marketing mix variables on wholesale markets, such as co-creation in marketing channels.

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## Appendix A. Data collection

Author 1 lead the research team composed of a lecturer and three graduate students. First, the team conducted face-to-face in-depth interviews at the Caiyuanba wholesale fruit market.

All interviews lasted 60–90 minutes, and at least one professor and one student participated in each.

The content of the interviews varied according to the interviewee profiles as follows:

**Table 1A.** Interview content by profile

Profile	Interview content
Caiyuanba Chief Manager	Change in turnover; choice of cooperative business owners; change in business scope; development of new business.
Caiyuanba E-commerce Manager	E-commerce turnover; service provided to wholesalers; pre-sales process; profit model of Xiangmanyuan platform.
Wholesaler	Consumer information optimization; market services; changes in transaction costs and logistics costs; operating income growth, commodity inventory issues; new business opportunities.
Buyer	Differences between online and physical fruit market; purchasing-delivery cycle; return services, fruit quality, and complaint mechanisms.

As the study progressed, this content was adjusted according to the theoretical perspective, and additional interviews were conducted with each interviewee. The following table provides the details.

**Table 2A.** Number of interviews

Profile	Gender	Age	Education	Number of interviews	Total duration (hours)
Caiyuanba Chief Manager (M1)	Male	46	Master	2	3
Caiyuanba E-commerce Manager (M2)	Male	37	Bachelor	2	3
Wholesaler 1 (W1)	Male	41	Bachelor	3	3
Wholesaler 2 (W2)	Male	35	Bachelor	3	3
Wholesaler 3 (W3)	Female	38	High school	3	3
Wholesaler 4 (W4)	Male	50	High school	3	3
Buyer 1 (B1)	Male	48	Bachelor	2	2
Buyer 2 (B2)	Female	52	Junior high school	2	2
Buyer 3 (B3)	Female	39	Master	2	2
Buyer 4 (B4)	Male	34	Bachelor	2	2
<b>Total</b>				<b>24</b>	<b>26</b>